Claims

We claim:

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1. A method for providing a vertebrate animal with a therapeutically effective amount of a protein, said method comprising introducing into cells of said animal an effective amount of a recombinant entomopox virus vector, wherein said vector comprises a polynucleotide encoding said protein.

2. The method according to claim 1, wherein said animal is a mammal.

3. The method according to claim 2, wherein said mammal is a human.

4. The method according to claim 1, wherein said vector comprises inverted terminal repeat sequences flanking said polynucleotide encoding said protein.

5. The method according to claim 4, wherein said inverted terminal repeat sequences are derived from adeno-associated virus.

6. The method according to claim 1, wherein said vector comprises a promoter sequence capable of driving expression of said polynucleotide encoding said protein.

7. The method according to claim 6, wherein said promoter sequence is selected from the group consisting of a CMV promoter sequence and herpes TK promoter sequence.

8. The method according claim 1, wherein said protein encoded by said polynucleotide is selected from the group consisting of interleukins, cytokines, growth factors, interferons, enzymes and structural proteins.

9. The method according to claim 1, wherein said vector is introduced into said cells of said animal by infection in a viral particle.

10. The method according to claim 1, wherein said vector is introduced into said cells of said animal by means selected from the group consisting of transfection, transduction and injection.

11. The method according to claim 1, wherein said vector is introduced into said cells of said animal *in vitro* and said treated cells are introduced into said animal.

12. The method according to claim 1, wherein said vector is introduced into said cells of said animal *in vivo*.

13. The method according to claim 1, wherein said polynucleotide encoding said protein is greater than about 10 kb in size.

14. The method according to claim 1, wherein said polynucleotide also encodes a selectable marker protein.

15. A recombinant entomopox virus vector comprising a polynucleotide encoding a protein capable of providing a therapeutic effect to an animal when expressed in said animal.

16. The recombinant vector according to claim 15, wherein said animal is a mammal.

17. The vector according to claim 16, wherein said mammal is a human.

18. The vector according to claim 15, wherein said entomopox virus is *Amsacta moorei*.

19. The vector according to claim 15, wherein said vector comprises inverted terminal repeat sequences flanking said polynucleotide encoding said protein.

20. The vector according to claim 19, wherein said inverted terminal repeat sequences are derived from adeno-associated virus.

21. The vector according to claim 15, wherein said vector comprises a promoter sequence capable of driving expression of said polynucleotide encoding said protein.

22. The vector according to claim 21, wherein said promoter sequences are selected from the group consisting of CMV and herpes TK.

23. The vector according to claim 15, wherein said protein encoded by said polynucleotide is selected from the group consisting of interleukins, cytokines, growth factors, interferons, enzymes and structural proteins.

24. The vector according to claim 15, wherein said polynucleotide encoding said protein is greater than about 10 kb in size.

25. The vector according to claim 15, wherein said polynucleotide also encodes a selectable marker protein.

26. A composition of matter comprising a recombinant entomopox vector, wherein said vector comprises a polynucleotide encoding a protein capable of providing a therapeutic effect to an animal when expressed in said animal, and

wherein said composition of matter is selected from the group consisting of viral particles and cells.

27. The cell according to claim 26, wherein said cell expresses a protein encoded by said polynucleotide.

28. An isolated polynucleotide encoding an *Amsacta moorei* entomopox virus protein selected from the group consisting of triacylglyceride lipase, Cu^{++}/Zn^{++} superoxide dismutase, CPD photolyase, baculovirus-like inhibitor of apoptosis, first poly(A) polymerase small subunit, second poly(A) polymerase small subunit, first DNA polymerase, second DNA polymerase, ABC transporter-like protein, Kunitz-motif protease inhibitor and poly(A) polymerase large subunit.

Sub a3

29. The polynucleotide according to claim 28, wherein said triacylglyceride lipase comprises SEQ ID NO: 12 or a fragment or variant thereof.

30. The polynucleotide according to claim 28, wherein said polynucleotide comprises SEQ ID NO: 1 or a fragment or variant thereof.

31. The polynucleotide according to claim 28, wherein said polynucleotide hybridizes with the sequence as set forth in SEQ ID NO: 1 or its complement.

Sub a4

32. The polynucleotide according to claim 28, wherein said Cu^{++}/Zn^{++} superoxide dismutase comprises SEQ ID NO: 13 or a fragment or variant thereof.

33. The polynucleotide according to claim 28, wherein said polynucleotide comprises SEQ ID NO: 2 or a fragment or variant thereof.

34. The polynucleotide according to claim 28, wherein said polynucleotide hybridizes with the sequence as set forth in SEQ ID NO: 2 or its complement.

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35. The polynucleotide according to claim 28, wherein said CPD photolyase comprises SEQ ID NO: 14 or a fragment or variant thereof.

36. The polynucleotide according to claim 28, wherein said polynucleotide comprises SEQ ID NO: 3 or a fragment or variant thereof.

37. The polynucleotide according to claim 28, wherein said polynucleotide hybridizes with the sequence as set forth in SEQ ID NO: 3 or its complement.

sub a6

38. The polynucleotide according to claim 28, wherein said baculovirus-like inhibitor of apoptosis comprises SEQ ID NO: 15 or a fragment or variant thereof.

sub a6

39. The polynucleotide according to claim 28, wherein said polynucleotide comprises SEQ ID NO: 4 or a fragment or variant thereof.

40. The polynucleotide according to claim 28, wherein said polynucleotide hybridizes with the sequence as set forth in SEQ ID NO: 4 or its complement.

Sub a7

41. The polynucleotide according to claim 28, wherein said first poly(A) polymerase small subunit comprises SEQ ID NO: 16 or a fragment or variant thereof.

42. The polynucleotide according to claim 28, wherein said polynucleotide comprises SEQ ID NO: 5 or a fragment or variant thereof.

43. The polynucleotide according to claim 28, wherein said polynucleotide hybridizes with the sequence as set forth in SEQ ID NO: 5 or its complement.

44. The polynucleotide according to claim 28, wherein said second poly(A) polymerase small subunit comprises SEQ ID NO: 17 or a fragment or variant thereof.

45. The polynucleotide according to claim 28, wherein said polynucleotide comprises SEQ ID NO: 6 or a fragment or variant thereof.

46. The polynucleotide according to claim 28, wherein said polynucleotide hybridizes with the sequence as set forth in SEQ ID NO: 6 or its complement.

47. The polynucleotide according to claim 28, wherein said first DNA polymerase comprises SEQ ID NO: 18 or a fragment or variant thereof.

48. The polynucleotide according to claim 28, wherein said polynucleotide comprises SEQ ID NO: 7 or a fragment or variant thereof.

49. The polynucleotide according to claim 28, wherein said polynucleotide hybridizes with the sequence as set forth in SEQ ID NO: 7 or its complement.

50. The polynucleotide according to claim 28, wherein said second DNA polymerase comprises SEQ ID NO: 19 or a fragment or variant thereof.

51. The polynucleotide according to claim 28, wherein said polynucleotide comprises SEQ ID NO: 8 or a fragment or variant thereof.

52. The polynucleotide according to claim 28, wherein said polynucleotide hybridizes with the sequence as set forth in SEQ ID NO: 8 or its complement.

53. The polynucleotide according to claim 28, wherein said ABC transporter-like protein comprises SEQ ID NO: 20 or a fragment or variant thereof.

54. The polynucleotide according to claim 28, wherein said polynucleotide comprises SEQ ID NO: 9 or a fragment or variant thereof.

55. The polynucleotide according to claim 28, wherein said polynucleotide hybridizes with the sequence as set forth in SEQ ID NO: 9 or its complement.

56. The polynucleotide according to claim 28, wherein said Kunitz-motif protease inhibitor comprises SEQ ID NO: 21 or a fragment or variant thereof.

57. The polynucleotide according to claim 28, wherein said polynucleotide comprises SEQ ID NO: 10 or a fragment or variant thereof.

58. The polynucleotide according to claim 28, wherein said polynucleotide hybridizes with the sequence as set forth in SEQ ID NO: 10 or its complement.

59. The polynucleotide according to claim 28, wherein said poly(A) polymerase large subunit comprises SEQ ID NO: 22 or a fragment or variant thereof.

60. The polynucleotide according to claim 28, wherein said polynucleotide comprises SEQ ID NO: 11 or a fragment or variant thereof.

61. The polynucleotide according to claim 28, wherein said polynucleotide hybridizes with the sequence as set forth in SEQ ID NO: 11 or its complement.

62. An isolated *Amsacta moorei* entomopox virus protein selected from the group consisting of triacylglyceride lypase, Cu^{++}/Zn^{++} superoxide dismutase, CPD

photolyase, baculovirus-like inhibitor of apoptosis, first poly(A) polymerase small subunit, second poly(A) polymerase small subunit, first DNA polymerase, second DNA polymerase, ABC transporter-like protein, Kunitz-motif protease inhibitor and poly(A) polymerase large subunit.

subq 14

63. The triacylglyceride lipase of claim 62 comprising the amino acid sequence as set forth in SEQ ID NO: 12, or a fragment or variant thereof.

64. The Cu^{++}/Zn^{++} superoxide disumutase of claim 62 comprising the amino acid sequence as set forth in SEQ ID NO: 13, or a fragment or variant thereof.

65. The CPD photolyase of claim 62 comprising the amino acid sequence as set forth in SEQ ID NO: 14, or a fragment or variant thereof.

66. The baculovirus-like inhibitor of apoptosis of claim 62 comprising the amino acid sequence as set forth in SEQ ID NO: 15, or a fragment or variant thereof.

67. The first poly(A) polymerase small subunit of claim 62 comprising the amino acid sequence as set forth in SEQ ID NO: 16, or a fragment or variant thereof.

68. The second poly(A) polymerase small subunit of claim 62 comprising the amino acid sequence as set forth in SEQ ID NO: 17, or a fragment or variant thereof.

69. The first DNA polymerase of claim 62 comprising the amino acid sequence as set forth in SEQ ID NO: 18, or a fragment or variant thereof.

70. The second DNA polymerase of claim 62 comprising the amino acid sequence as set forth in SEQ ID NO: 19, or a fragment or variant thereof.

71. The ABC transporter-like protein of claim 62 comprising the amino acid sequence as set forth in SEQ ID NO: 20, or a fragment or variant thereof.

72. The Kunitz-motif protease inhibitor of claim 62 comprising the amino acid sequence as set forth in SEQ ID NO: 21, or a fragment or variant thereof.

73. The poly(A) polymerase large subunit of claim 62 comprising the amino acid sequence as set forth in SEQ ID NO: 22, or a fragment or variant thereof.

74. An isolated polynucleotide encoding an *Amsacta moorei* entomopox virus polypeptide, wherein said polynucleotide is selected from the group consisting of AMVITR10, AMV002, AMV047, AMV051, AMV054, AMV059, AMV061, AMV066, AMV078, AMV079, AMV081, AMV084, AMV087, AMV91, AMV093, AMV105, AMV114, AMV122, AMV135, AMV139, AMV147, AMV150, AMV153, AMV166, AMV167, AMV174, AMV181, AMV192, AMV193, AMV197, AMV199, AMV205, AMV221, AMV228, AMV230, AMV231, AMV234, AMV246, AMV248 and AMV256, or a fragment or variant thereof.

75. An isolated *Amsacta moorei* entomopox virus polypeptide encoded by a polynucleotide selected from the group consisting of AMVITR10, AMV002, AMV047, AMV051, AMV054, AMV059, AMV061, AMV066, AMV078, AMV079, AMV081, AMV084, AMV087, AMV91, AMV093, AMV105, AMV114, AMV122, AMV135, AMV139, AMV147, AMV150, AMV153, AMV166, AMV167, AMV174, AMV181, AMV192, AMV193, AMV197, AMV199, AMV205, AMV221, AMV228, AMV230, AMV231, AMV234, AMV246, AMV248 and AMV256, or a fragment or variant thereof.